I. Remarks

Status of Claims

Claims 25-48 are currently pending. Claim 48 has been withdrawn pending rejoinder upon the allowance of one or more of the claims of the elected group. The Examiner has acknowledged the request for rejoinder of the withdrawn claims should the product claims under consideration be found allowable. *See*, Paper No. 4202006, page 2.

II. Rejections of Claims 25-47 Under 35 U.S.C. §§ 101 and 112, First Paragraph

Claims 25-47 remain rejected under 35 U.S.C. § 101 for alleged lack of utility. *See*, Paper No. 4202006, page 2. In particular, the Examiner alleges that "the proposition that the antibody claimed is drawn to a carnosinase polypeptide was never disclosed . . . [and] [t]he only disclosure provided in the instant application is the brain-specific expression of the peptide and the possibility that the protein may be involved in neuronal and neurodegenerative disorders." *Id.*

In addition, the Examiner suggested in a telephonic interview on December 21, 2006, the Statement of Substance of the Interview for which is included herewith, that the deficiency resides in the fact that there was no disclosure that carnosinase is altered in tissue derived from a subject suffering from a neurodegenerative disorder as compared to normal tissue.

Applicants respectfully disagree and traverse this rejection.

A. The Specification Discloses a Specific and Substantial Utility

Despite the fact that the specification does not specifically refer to the protein recognized by the claimed antibodies as a "carnosinase," the specification clearly asserts a specific utility for the HHPEN62/carnosinase protein, wherein "polypeptides corresponding to this gene [HHPEN62] would be useful for treating, preventing, detecting and/or diagnosing neural and neurodegenerative disorders." *See*, page 85 [0197]. In addition, the specification discloses that the HHPEN62/carnosinase protein may function to promote neuronal survival, synapse formation, conductance, and neuronal differentiation. *Id.* at 86 [0197]. Therefore, since the specification clearly identifies a specific biological activity for the HHPEN62/carnosinase protein (*e.g.*, the promotion of neuronal survival, synapse formation, conductance, neuronal differentiation (*see*, page 86 [0197])), and reasonably correlates that activity to several specific disease conditions (*e.g.*, *inter alia*, neural and neurodegenerative

disorders), the specification has sufficiently identified a specific utility for the invention. M.P.E.P. § 2107.01 at 2100-32 (emphasis added); *see also*, Fujikawa v. Wattanasin, 39 U.S.P.Q.2d 1895 (Fed. Cir. 1996). Applicants submit that, based on the present specification, the ordinary skilled artisan would readily recognize the specific asserted utility of the claimed antibodies.

Moreover, the disclosed utilities for HHPEN62/carnosinase discussed above are substantial, as "the general rule [is] that the treatments of specific diseases or conditions meet the criteria of 35 U.S.C. § 101." *See*, Revised Interim Utility Guidelines Training Materials, page 6. Pharmacological or therapeutic inventions that provide any "immediate benefit to the public" satisfy 35 U.S.C. § 101. *See*, Nelson v. Bowler, 626 F.2d 853, 856, 206 U.S.P.Q. 881, 883 (C.C.P.A. 1980); *See also,* M.P.E.P. §2107.01(III). It is well-established that the mere identification of a pharmacological activity of a compound that is relevant to an asserted pharmacological use provides an "immediate benefit to the public" and satisfies the utility requirement. *Id.* Accordingly, the utilities asserted by Applicants are clearly substantial.

B. The Specific and Substantial Utility Disclosed in the Application is Credible in Light of the Pre-Filing Art

The specific and substantial utilities, *inter alia*, are credible in light of the pre-filing art. The functional activity disclosed in the specification can be attributed in part to the fact that the HHPEN62/carnosinase polypeptide of the instant invention is primarily expressed in the brain and is located in a particular chromosomal region (18q22-23), well-known in the art at the time of filing as a susceptibility loci for neuronal and neurodegenerative disorders. *See*, page 84 [0194] – [0195].

The link between neuronal and neurodegenerative disorders and the end of the long arm of chromosome 18 was well-documented in multiple papers that pre-dated the filing of the instant application. *See*, for example, **Exhibits A-C**. For instance, two papers by McMahon et al. demonstrated that bipolar and bipolar affective disorder are linked to chromosome 18q. *See*, **Exhibits B-C**. Similarly, Nothen et al. also demonstrated that bipolar affective disorder can be linked to 18q22-23. *See*, **Exhibit A**, page 81, col. 2.

In addition, carnosinase itself was linked to this very same region of chromosome 18q. For example, Willi et al. showed that a child with serum carnosinase deficiency had a deletion in chromosome 18q with a break point, based on the available markers, likely at

18q21.3, which would include the HHPEN62/carnosinase gene. *See*, **Exhibit D**, page 211, col. 2.

Thus, Applicants note that as of the filing date of the present invention it was well known that chromosome 18q22-23 was linked to neural and neurodegenerative disorders, as well as being the chromosomal locus for carnosinase. Therefore, one of ordinary skill in the art would immediately appreciate and would not question that based on its expression pattern and chromosome location at 18q22-23, HHPEN62/carnosinase protein, would be a useful invention for neural and neurodegenerative disorders. Indeed, the Federal Circuit has characterized the standard for utility by indicating:

> The threshold of utility is not high: An invention is "useful" under section 101 if it is capable of providing some identifiable benefit. *See Brenner v. Manson*, 383 U.S. 519, 534 (1996); *Brooktree Corp. v. Advanced Micro Devices, Inc.*, 977 F.2d 1555, 1571 (Fed. Cir. 1992) ("To violate § 101 the claimed device must be totally incapable of achieving a useful result"); *Fuller v. Berger*, 120 F. 247, 275 (7th Cir. 1903) (the test for utility is whether the invention "is capable of serving any beneficial end").

Juicy Whip, Inc. v. Orange Bang Inc., 51 U.S.P.Q.2d 1700, 1702 (Fed. Cir. 1999). Consequently, one of skill in the art at the time of filing of the instant application would have found the asserted utilities to be specific, substantial, and credible.

C. The Post-Filing Art Corroborates the Asserted Utility

As the Examiner confirmed, the post filing date references by Teufel et al. and Vistoli et al., discussed in the Reply to the final Office Action, further illustrate the use of the HHPEN62/carnosinase protein for "treating, preventing and diagnosis of neural and neurodegenerative disorders." *See*, Paper No. 20060911, page 2. Consequently, these references were merely presented to corroborate (not establish) the specific, substantial and credible utility of the HHPEN62/carnosinase protein.[1] Thus, independent, third party research entities have confirmed the Applicants' specific, substantial, and credible asserted utilities.

[1] Applicants note that supportive data in third party publications, dated after the applicants' priority date, "can be used to substantiate any doubts as to an asserted utility since it pertains to the accuracy of a statement already in the specification." *See e.g., In re Brana* 51 F.3d 1560, 1567 at n19 (Fed. Cir. 1995).

D. Pre-Filing Art Showed Differential Expression of Carnosinase in Normal Subjects Relative to Subjects Suffering From Neurodegenerative Disorders

During a telephonic interview conducted on December 21, 2006, the Examiner suggested that other art showing differential expression of carnosinase in normal tissue versus tissue from a subject suffering from a neurodegenerative disorder would be positively considered. *See*, Statement of Substance of the Interview filed herewith. Accordingly, pre-filing prior art demonstrates differential expression of carnosinase in normal subjects versus those suffering from a neurodegenerative disorder, demonstrating a role for carnosinase in neural and neurodegenerative disorders. *See*, **Exhibits E-F**. In one example, Wisniewski et al. demonstrated that carnosinase deficiency in a patient resulted in progressive neurological problems and peripheral sensory neuropathy. *See*, **Exhibit E**, page 143, col. 1. In another example, Lenney et al. demonstrated that homocarnosinosis, a rare disorder caused by a deficiency in carnosinase, results in patients with "progressive mental deterioration, spastic paraplegia, and retinal pigmentation." *See*, **Exhibit F**, page 157.

E. Claims 25-47 Satisfy 35 U.S.C. § 101

In view of the above arguments, Applicants have provided evidence and reasoning which supports the Applicants' assertion of a specific, substantial, and credible utility for the protein HHPEN62/carnosinase. Applicants rely on the specific uses "for treating, preventing, detecting and/or diagnosing neural and neurodegenerative disorders" disclosed in the specification in light of the art at the time of filing in establishing this utility. *See*, page 85 [0197]. As such, it logically follows that there is at least one patentable use for the antibodies of the present invention. Therefore, Applicants respectfully submit that the rejection of claims 25-47 under 35 U.S.C. § 101 has been obviated and respectfully request that the rejection of the claims be reconsidered and withdrawn.

F. Claims 25-47 Satisfy 35 U.S.C. § 112, First Paragraph

For the reasons discussed above in response to the rejection under 35 U.S.C. § 101, the claimed invention is supported by a specific utility. The Examiner "should not impose a 35 U.S.C. § 112, first paragraph, rejection grounded on a 'lack of utility' basis unless a 35 U.S.C. § 101 rejection is proper." M.P.E.P. § 2107 (IV) at 2100-36. Therefore, because the claimed invention complies with the utility requirement of 35 U.S.C. § 101, the rejections under 35 U.S.C. § 112, first paragraph, based on the alleged lack of utility of the claimed

invention, should be withdrawn. *See,* Paper No. 20060720, page 6. Accordingly, Applicants respectfully request that the rejection of claims 25-47 under 35 U.S.C. § 112, first paragraph, be reconsidered and withdrawn.

IV. Conclusion

The Applicant respectfully requests that the aforementioned amendments and remarks be entered and made of record in the file history of the instant application. In view of the foregoing remarks, the Applicant believes that the Examiner's concerns have been fully addressed and that this application is in condition for allowance. An early notice to that effect is urged. The Examiner is invited to call the undersigned at the phone number provided below if any further action by the Applicant would expedite the examination of this application.

Finally, if there are any fees due in connection with the filing of this paper, please charge the fees to our Deposit Account No. 08-3425. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account.

Dated: JANUARY 23, 2007

Respectfully submitted,

By Jared S Cohen

Jared S. Cohen
Registration No.: 56,175
HUMAN GENOME SCIENCES, INC.
Intellectual Property Dept.
14200 Shady Grove Road
Rockville, Maryland 20850
(301) 315-1773

MJP/JSC